

**NEW SPECIES OF THE GENERA
STICTOPHAULA HEBARD AND *MIROLLIA* STÅL
(ORTHOPTERA: TETTIGONIIDAE: PHANEROPTERINAE)
FROM CHINA¹**

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ABSTRACT. This paper describes a new species of *Stictophaula* Hebard (*S. sinica* sp. n.) and five species of *Mirrollia* Stål, four of which are new to science (*M. bispinosa* sp. n., *M. hainani* sp. n., *M. yunnani* sp. n., *M. angusticerca* sp. n., and *M. composita* Bey-Bienko) all from southern China. Genital complex and other diagnostic characters are illustrated.

KEY WORDS: new species, *Stictophaula*, *Mirrollia*, Orthoptera, Tettigoniidae, Phaneropterinae, genitalia, China

The genus *Mirrollia* was established by Stål in 1873, a subsequent designation for *Locusta* (*Phylloptera*) *carinata* de Haan. Subsequently, several authors (Hebard 1922; Karny 1925, 1926; Shiraki 1930; Bey-Bienko 1957, 1962; Ingrisch 1990, 1998; Mu, He and Wang 1998; Ingrisch and Shishodia 1998, 2000; Gorochov 1999, 2003b) have described 22 species (or 23 species and subspecies), from Philippines, Java, Borneo, southern China, Vietnam, Thailand, and India.

Hebard erected the genus *Stictophaula* in 1922 for three new species, *S. bakeri*, *S. micra*, and *S. quadridens* from Singapore, and three known species, *Phaula spinosolaminata* Brunner, *Locusta* (*Phaneroptera*) *trichopus* Haan (both from Java) and *Phaula chlorotica* Brunner (from Singapore). Subsequently, Ingrisch (1994) described three new species from Thailand. Gorochov (1999, 2003a) described ten new species and subspecies from Vietnam, Thailand, Java, Borneo, and Sumatra. Gorochov (1999) removed *Locusta* (*Phaneroptera*) *trichopus* De Haan and *Stictophaula ocellata* Ingrisch, 1994 from *Stictophaula* and placed them in the genus *Arnobia* Stål, 1876.

Currently, 23 species (or 24 species and subspecies) of *Mirrollia* and 16 species (or 17 species and subspecies) of *Stictophaula* are known from the Oriental region. Of those, five species of *Mirrollia* but no species of *Stictophaula* have been recorded from China.

In examining the collections of the Beijing Institute of Zoology, Chinese Academy of Sciences (IZCAS) and of the Beijing Agricultural University (AU), we found one new species of *Stictophaula* (*S. sinica*) and four new species of *Mirrollia* (*M. bispinosa*, *M. hainani*, *M. yunnani*, and *M. angusticerca*), which are described herein. The female of *M. composita* Bey-Bienko is described for the first time (formerly this species was known only from a single male). The signif-

¹ Submitted on August 11, 2002. Accepted on November 18, 2004.

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icant taxonomic characters for these genera are details of the male and female abdominal apex, especially sclerites of the male genitalia, male stridulatory apparatus (Ingrisch 1994, 1998; Gorochov 1999; Ingrisch and Shishodia 2000), and the head rostrum (Gorochov 1999, 2003b).

Mirollia Stål, 1873

Mirollia bispinosa, NEW SPECIES

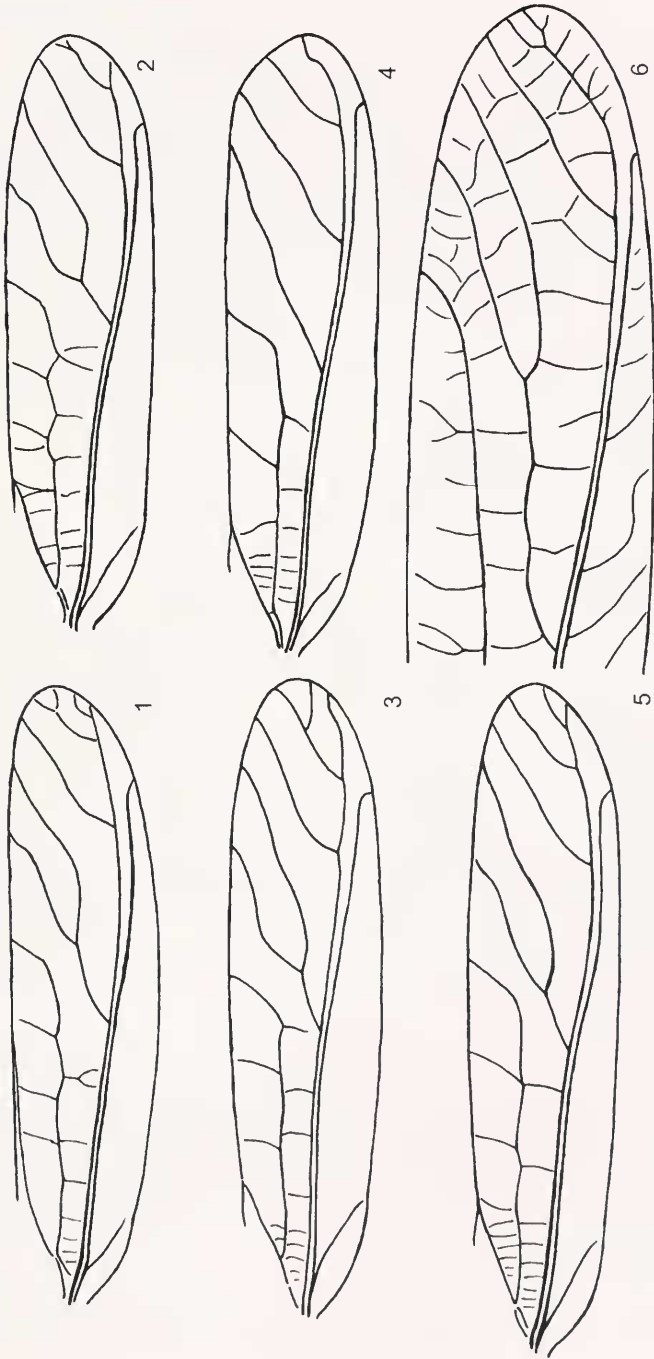
(Figs. 1, 7-13)

Type Data: Holotype, male, CHINA: HUNAN PROVINCE: Cili, Jianya, 26.VIII.1988 (collector unknown) (IZCAS). Paratypes. CHINA: HUNAN PROVINCE: 1 male, Cili, 2.VIII.1988 (collector unknown) (IZCAS); 1 male, Changsha, 15.VII.1985, coll. Chen Naizhong (AU); GUANGXI PROVINCE: 1 male, 1 female, Guilin, Yanshan, 9.IX.1952 (male) and 5.VI.1953 (female) (collector unknown) (IZCAS).

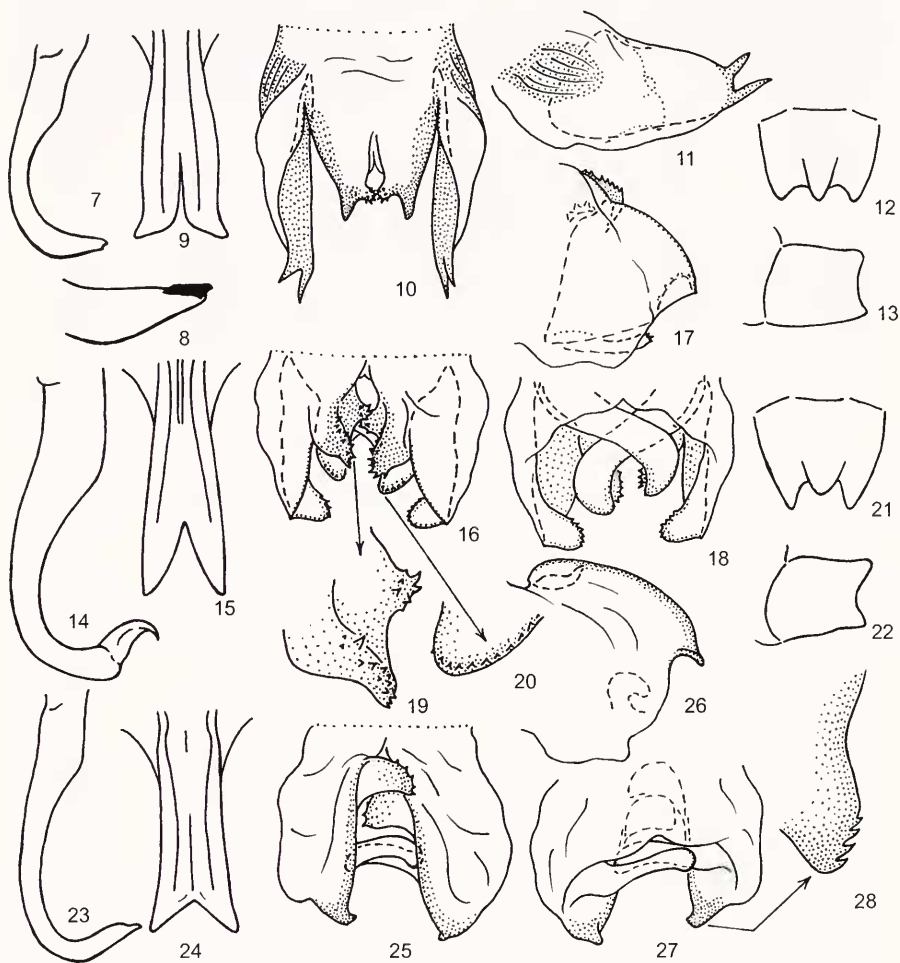
Description: Male (holotype). Body yellowish green with dark brown spots on antennae (including scape), numerous dots on upper half of pronotum and along anal edge of tegmina, and a large spot on widened part of dorsal part of upper tegmen (this spot occupies central area of this part; light brown stridulatory vein divides this spot into smaller proximal and larger distal parts; size of this spot approximately equal to size of mirror of lower tegmen); slight brownish darkenings near auditory organ of fore tibiae present also. Rostrum distinctly (but not strongly) S-shaped in profile, similar to that of *M. fallax* Bey-Bienko (Gorochov, 1999: Fig. 87), but with large lateral ocelli. Shape of tegmina as in Fig. 1; upper tegmen with 2 branches on RS and 3 more or less distinct branches on RA (Fig. 1), but lower tegmen with single RS and 4 more or less distinct branches on RA; hind wings very distinctly longer than tegmina. Cerci comparatively short, not very thin and not very strongly curved (Fig. 7); their apex with characteristic small and heavily sclerotized ridge (Fig. 8); genital plate with characteristic shape of its narrow hind part provided with deep and very narrow hind notch (Fig. 9). Genitalia with rather long lateral lobes provided with 2 apical spines directed backward (these spines almost immovable in relation to each other); a pair of medial genital lobes with small membranous upper (medial) projections (armed by distinct denticles) and larger semi-sclerotized lower (lateral) rounded additional lobes (these lobes without any denticles) (Figs. 10, 11).

Variation: Occasionally, rostrum more strongly S-shaped than in holotype [almost intermediate between those of *M. fallax* and *M. carinata* (Haan) (Gorochov, 1999: Figs. 87, 95)] and outer side of proximal part of antennae dark brown. All males with RS of both tegmina similar to RS of upper tegmen of holotype.

Female: Similar to male in general appearance and structure of lateral tegminal part, but without dark spot on dorsal part of upper tegmen. Apical part of genital plate with a pair of not deep hind notches; hind unpaired median projection of this plate not shorter than hind lateral projections (Figs. 12, 13); ovipositor typical of this genus.



Figs. 1-6. *Mirollia* and *Stictophaula*, lateral part of male tegmen. 1, *M. hispinosa* sp. n. (holotype); 2, *M. hainani* sp. n. (holotype); 3, *M. yunnanii* sp. n.; 4, *M. angusticercus* sp. n.; 5, *M. composita* B.-Bien.; 6, *S. sinica* sp. n.



Figs. 7-28. *Mirollia*. 7-13, *M. bispinosa* sp. n. (7-11, holotype); 14-22, *M. hainani* sp. n. (14-20, holotype); 23-28, *M. yumani* sp. n. Left male cercus (7, 14, 23) and its apical part (8) from above; distal part of male genital plate from below-behind (9, 15, 24); male genitalia from above (10, 16, 25), from side (11, 17, 26), and from below (18, 27); female genital plate from below (12, 21) and from side (13, 22); structures of male genitalia: upper medial lobe (19) and apex of lower medial lobe (20) from above, apical part of lateral lobe from below-behind (28).

Measurements (length in mm): Body: male, 14-17, female 18; body with wings: male 29-32, female 32; pronotum: male 3.8-4.2, female 4.5; tegmen: male 22-24, female 24; hind femur: male 12-13, female 13; ovipositor 6.

Differential diagnosis: *Mirollia bispinosa* is most similar to *M. quadripunctata* Ingrisch, *M. beybienkoi* Gorochov, and *M. caligata* Ingrisch, but it differs from those in the size, shape, and position of apical spines of lateral genital lobes of male. From *M. formosana* Shiraki, this new species is distinguished by the other coloration of scape (not reddish brown), the presence of numerous dark dots on pronotum, and the absence of any tubercles on inner side of male cercal base; from *M. rufonotata* Mu, He and Wang, it differs in the absence of any red spots on lateral pronotal lobes (it has only blackish brown dots on upper part of pronotum), the shorter tegmina of female, and the somewhat other shape of female genital plate.

Mirollia hainani, NEW SPECIES

(Figs. 2, 14-22)

Type Data: Holotype. Male, CHINA: HAINAN ISLAND: Jianfengling, 14.X.1983, coll. Chen Peizhen (IZCAS). Paratypes, CHINA: HAINAN ISLAND: 1 male, 1 female, Jianfengling, 27.IV.1983 (male) and 19.VI.1983 (female), coll. Gu Maobin (IZCAS); 1 male, Ledong, 26.VIII. 1984, coll. Lin Youdong (IZCAS); 1 male, Qiongzong, 8.VII.1984, coll. Lin Youdong (IZCAS); 1 female, Tongshen, 340 m, 26.III.1960, coll. Li Changqing (IZCAS); 1 female, Yinggen, 200 m, 5.V.1960, coll. Li Changqing (IZCAS).

Description: Male (holotype). Very similar to previous species (*M. bispinosa*) in general appearance including size, shape of body, and coloration, but dark parts of antennae somewhat smaller, pronotum with only a pair of dark dots on fore half of disc, and stridulatory vein of upper tegmen almost dark brown. Rostrum slightly S-shaped, almost as in *M. foliolum* Gorochov (Gorochov, 1999, Fig. 97); lateral ocelli medium-sized. Tegmina and hind wings almost as in *M. bispinosa* (Fig. 2); R with 2 branches on RS and 3 more or less distinct branches on RA in both tegmina. Cerci rather long, but not very thin, strongly curved and with large apical hook (Fig. 14); genital plate with shape of its narrow part as in Fig. 15 (this part with deep, but not very narrow, hind notch). Genitalia (Figs. 16-18) with rather short and curved lateral lobes provided with denticles on apical part; medial genital lobes well divided into short upper additional lobes [these additional lobes with denticles on apical parts and on proximal medial projections of these lobes (Fig. 19)] and longer and rather narrow lower additional lobes [latter lobes with rounded apex denticulated along its hind edge above (Fig. 20)].

Variation: Occasionally, shape of rostrum almost as in *M. bispinosa*, and stridulatory vein of upper tegmen somewhat lighter than in holotype.

Female: General appearance and lateral part of tegmina as in male, but without dark spot on dorsal part of upper tegmen. Apical part of genital plate with a pair of somewhat deeper (than in *M. bispinosa*) hind notches; hind unpaired

median projection of this plate somewhat shorter than hind lateral projections (Figs. 21, 22); ovipositor indistinguishable from that of previous species.

Measurements (length in mm): Body: male 13-17, female 16-18; body with wings: male 25-28, female 30-32; pronotum: male 4-4.4, female 4.3-4.5; tegmen: male 19-21, female 23-25; hind femur: male 11-13, female 12-13; ovipositor 5.3-5.7.

Differential diagnosis: This new species is more or less similar to *M. carinata* (Haan), *M. proxima* Gorochov, *M. javae* Gorochov, *M. ranongi* Gorochov, *M. hexapinna* Ingrisch, *M. bigemina* Ingrisch, *M. hamata* Ingrisch, and *M. rostellum* Gorochov, but *M. hainani* differs from them in the deeper apical notch of male genital plate, the shape of male cerci, and the details of male genitalia (Figs. 19, 20).

Mirollia yunnani, NEW SPECIES

(Figs. 3, 23-28)

Type Data: Holotype, male, CHINA: YUNNAN PROVINCE: Changyuan, 1010 m, 16.V.1980 (collector unknown) (IZCAS).

Description: Male (holotype). Similar to *M. hainani* in size, structure of body and wings, as well as details of coloration, but rostrum as in *M. bispinosa*, cerci with small apical hook (Fig. 23), genital plate with not deep and not narrow hind notch (Fig. 24), and genitalia as in Figs. 25-27: their lateral lobes rather short and with narrow denticulated apex (Fig. 28), their medial lobes divided into upper denticulated processes (partly fused with proximal part of lateral lobes) (Fig. 25) and longer and narrow lower additional lobes not denticulated and directed medially (Fig. 27).

Measurements of male (length in mm): Body 15; body with wings 31; pronotum 4.5; tegmen 23; hind femur 12.

Female unknown.

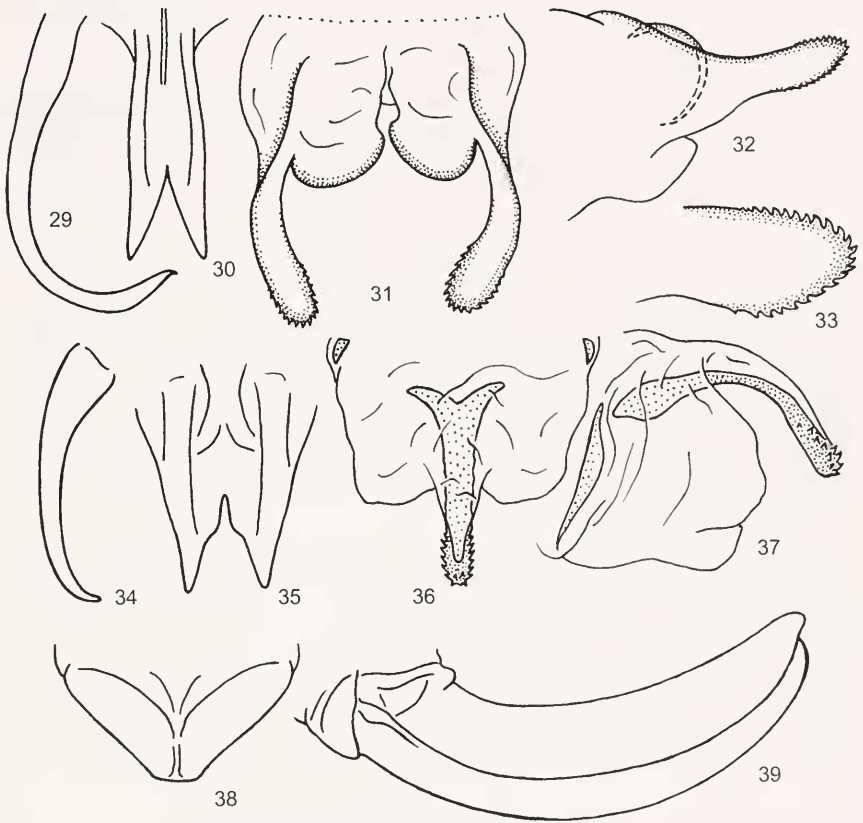
Differential diagnosis: This new species is very similar to *M. carinata* (Haan) and partly similar to *M. bigemina* Ingrisch in the shape of distal part of male genital plate, but *M. yunnani* is well distinguished from them in the other structure of male genitalia and shape of male cerci.

Mirollia angusticerca, NEW SPECIES

(Figs. 4, 29-33)

Type Data: Holotype, male, CHINA: HAINAN ISLAND: Jianfengling, 28.IV.1983, coll. Gu Maobin (IZCAS).

Description: Male (holotype). Size and general shape of body similar to previous species. Coloration light brownish (almost yellow) with a pair of small brown spots behind eyes, spotted antennae (including scape), several dark (blackish) dots on upper part of pronotum (including a pair of larger dots on fore half of disc and 6 distinct dots along its hind edge), darkish small marks near auditory organ and in place of articulation of femora with tibiae, large brown spot on dor-



Figs. 29-39. *Mirollia* and *Stictophanla*. 29-33, *M. angusticerca* sp. n.; 34-39, *S. sinica* sp. n. Left male cercus from above (29, 34); distal part of male genital plate from below-behind (30) and from below (35); male genitalia from above (31, 36) and from side (32, 37); apical part of lateral lobe of male genitalia from side and slightly below (33); female genital plate from below (38); ovipositor and genital plate from side (39).

sal part of upper tegmen including stridulatory vein (this spot occupies this part almost completely), and several small dark spots on different places of tegmina and lower side of hind tibiae. Tegmina with roundly angular subapical part of anal edge; R with single RS and 3 more or less distinct branches on RA in both tegmina; hind wings as in all previous species. Cerci long and thin, well curved, with small apical hook (Fig. 29); genital plate with distal part almost as in *M. hainani*, but its lateral apical lobes slightly longer and narrower (Fig. 30). Genitalia with long lateral lobes (Figs. 31, 32); their distal part rounded and denticulated (Fig. 33); medial genital lobes also rounded, not divided and not denticulated (Fig. 31).

Measurements of male (length in mm): Body 14; body with wings 29; pronotum 4.5; tegmen 22; hind femur 12.5.

Female unknown.

Differential diagnosis: *Mirollia angusticerca* is similar to *M. longipinna* Ingrisch in the long denticulated lobes of male genitalia, but it well differs from this Indian species in the shape of male genital plate and above-mentioned genital lobes.

***Mirollia composita* Bey-Bienko, 1962**

(Fig. 5)

Material Examined: CHINA: YUNNAN PROVINCE: 1 male, 1 female, Xishuangbanna, Mengla, 620-650 m, 5.V-10.VI.1959, coll. Li Xiaofu (IZCAS); 1 male, 1 female, Xishuangbanna, Menghun, 1200-1400 m, 25.V-14.VI.1958, coll. Meng Xuwu and Zhang Yiran (IZCAS); 2 males, 1 female, Xishuangbanna, Damenglong, 650 m, 10-21.IV.1958, coll. Meng Xuwu, Pu Fuji and Hong Chunpei (IZCAS); 1 female, Xishuangbanna, Yiwu, 800-1300 m, 11.V.1959, coll. Li Xiaofu (IZCAS).

Description of female (nov.): Very similar to female of *M. bispinosa* and *M. hainani*, but coloration of pronotum as in *M. hainani*, rostrum of head and genital plate practically indistinguishable from those of *M. bispinosa*. Lateral part of tegmina in all these specimens with 2 branches on RS and 3 more or less distinct branches on RA (as in male from Fig. 5); sometimes, this part of tegmina with sparse dark dots or very small spots.

Measurements of female (length in mm): Body 16-19; body with wings 30-35; pronotum 4-4.3; tegmen 21-25; hind femur 12-13.5; ovipositor 5.5-6.

***Genus Stictophaula* Hebard, 1922**

***Stictophaula sinica*, NEW SPECIES**

(Figs. 6, 34-39)

Type Data: Holotype, male, CHINA: YUNNAN PROVINCE: Xishuangbanna, Xiaomengyang, 850 m, 24.X.1957, coll. Zang Lingchao (IZCAS). Paratypes. CHINA: YUNNAN PROVINCE: 3 females, same data as holotype, but 25-28.X.1957 and 6.IX.1958, coll. Zang Lingchao and Wang Shuyong (IZCAS); 1 female, Xishuangbanna, Mengla County, 620-650 m, 15.VI.1958, coll. Pu Fuji (IZCAS).

Description. Male (holotype). Structure of body and size typical of this genus. Coloration green with rather sparse small dark dots on upper part of pronotum, numerous somewhat larger blackish dots on fore femora (these dots form 4 more or less distinct spots on upper part of femora) and near auditory organ (on fore tibiae), black small lower spines of fore femora, dark brown spot on proximal half of dorsal part of both tegmina, and sparse small dark spots in different places of lateral part of tegmina. Mirror of lower tegmen developed, but small and triangular, similar to that of *S. gialaiensis* Gor., *S. daclacensis* Gor., and *S. thaiensis* Gor. (Gorochov, 1999: Figs. 1, 3, 5); R with 2 branches on RS

and 2 distinct branches on RA (Fig. 6); hind wings clearly longer than tegmina. Cerci with hooked apical part; lateral apical lobes of genital plate with slight (but distinct) almost angular medial projections (Fig. 35). Median process of genitalia with curved and comparatively thin sclerite provided with rather numerous distal denticles; upper part of this process membranous (excepting its apex) (Figs. 36, 37).

Female. Similar to male, but dorsal part of tegmina with very small dark spot at base of its lateral edge only. Genital plate short, triangular, with hardy truncated apex (Fig. 38); ovipositor as in Fig. 39.

Measurements (length in mm): Body: male 22, female 21-24; body with wings: male 46, female 46-48; pronotum: male 5.5, female 5.8-6.3; tegmen: male 36, female 37-39; hind femur: male 20.5, female 21-22; ovipositor 8.5-9.5.

Differential diagnosis: *Stictophaula sinica* is similar to *S. armata* Ingrisch and *S. grigorenkoi* Gorochov in the shape of male genital plate and sclerite of male genitalia, but the hind median notch of this plate is less narrow, the hind lateral lobes of this plate with distinct or more distinct medial projections, and the above-mentioned genital sclerite is narrower than in *S. armata* (and without basal bend characteristic of this species) and distinctly wider than in *S. grigorenkoi* (Ingrisch, 1994, Figs. 1-8; Gorochov, 1999, Figs. 76-80).

ACKNOWLEDGEMENTS

The authors thank Miss. Liu Chunxiang for her big technical assistance. This work was supported by the foundation "Lujixi Academic Exchange Program" of Chinese Academy of Sciences in 2001.

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